

## ABSTRACT

First and second quadrature modulators 109, 110 carry out quadrature modulation on Nyquist signals given a delay difference corresponding to  $2/4$  of their  
5 respective symbol periods using a cosine wave having a frequency corresponding to an odd-number multiple of the basic frequency of each Nyquist signal as a carrier. Third quadrature modulator 113 carries out quadrature modulation on the modulated signal obtained from first  
10 quadrature modulator 109 and the modulated signal obtained from second quadrature modulator 110 using a carrier having a predetermined frequency. Thus, it is possible to obtain modulated signals with four Nyquist signals allocated in a 1-symbol period  $T$  without any  
15 interference with one another.